

Best Available Control
Technology (BACT)
and
BACT for Toxics (TBACT)
for Small to Medium Sized
Standby Diesel Engines

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Welcome!

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Agenda

- Air District Mission
- BAAQMD Engineering Division Activities
- Internal Combustion Engine Permit Statistics
- Best Available Control Technology Regulation
- Best Available Control Technology for Toxics Regulation
- Establishing the “Best Available Control Technology” for a Particular Application
- Achieved in Practice Determination
- EPA Tier 4 Emission Standards
- Availability of Certified Tier 4 Engines
- How to Comply with the Tier 4 Emission Standards
- Advantages to Certified: Proposed Requirements
- What Can I Do for Faster Permitting?
- FAQs
- Not Allowed to Install Certified Tier 4?
- Questions & Answer Period

Air District Mission

- *“To protect and improve public health, air quality and the global climate”*
- **Bay Area Air Quality Management District**
 - Established in 1955
 - Nine Bay Area Counties
 - Seven Million Residents
 - 5 Million vehicles
 - 5,340 square miles



BAAQMD Engineering Division Activities

Issue Permits for over 10,000 facilities with over 24,000 sources

Receive 1,200 applications per year for new and modified sources – approximately 400 engine applications

Conduct 300 health risk assessments per year for new and existing facilities

Issue Authorities to Construct, Permits to Operate, Registrations & Certificates of Exemptions

Maintain emissions inventory for permitted facilities: greenhouse gases (GHG), criteria pollutants and toxic air contaminants

Issue and maintain Federal Title V Permits for 85 Major facilities

BAAQMD Internal Combustion Engine Permit Statistics

400 engine applications received per year

10,588 Permitted Internal Combustion Engines

435 Prime Engines – 191 Diesel, 149 Natural Gas/LPG/Propane, 41 Digester gas, 43 landfill gas

982 Natural Gas/LPG / Propane Emergency Backup Engines

8,738 Diesel Emergency Backup Engines

6,717 Diesel Emergency Backup Engines that are larger than 50 BHP and less than 1000 BHP



Best Available Control Technology Regulation

- Regulation 2 Rule 2 “New Source Review”
- BACT Requirement – Regulation 2-2-301
- **BACT Trigger:** Potential to emit 10 pounds or more per day per pollutant
- Potential to Emit (PTE) is based upon 24 hours per day emergency operation
- PTE – defined as the “The maximum capacity of a source or facility to emit a pollutant based on its physical and operational design.”
 - Does not distinguish between planned and emergency operation

Best Available Control Technology for Toxics Regulation

- Regulation 2 Rule 5 “New Source Review of Toxic Air Contaminants”
- TBACT Requirement – Regulation 2-5-301
- **TBACT Trigger:** The source risk is a cancer risk greater than 1.0 in one million and/or a chronic hazard index greater than 0.20.
- **Source Risk:** the health risk resulting from the emissions of all toxic air contaminants from a new or modified source of toxic air contaminants, as indicated by Health Risk Assessment for the Maximally Exposed Individual.
- **Cancer Risk:** an estimate of the chance that an individual may develop cancer as a result of exposure to emitted carcinogens at a given receptor location, and considering, where appropriate, Age Sensitivity Factors to account for inherent increased susceptibility to carcinogens during infancy and childhood.

Establishing the “Best Available Control Technology” For a Particular Application

BACT / TBACT– Most Stringent Level of Emissions Control

- Achieved in Practice
 - If a particular facility achieves a certain level of emissions control, then that level of control is required for all sources of the same type
- Technologically Feasible/Cost-effective (BACT)
 - The cost of any air pollution control equipment must meet cost-effectiveness criteria before it can be required
- Technologically Feasible/Cost Consideration (TBACT)
 - The costs of achieving emissions reductions must be considered

BACT / TBACT Guidelines

- Compiles information about what has been achieved in practice at other facilities
 - Useful starting point for a BACT / TBACT analysis
- Does not supersede the BACT regulations
 - If a more stringent level of emissions control has been achieved in practice and/or is technologically feasible & cost effective, BACT requires it

Achieved in Practice: EPA Tier 4 Final

Air District Permits:

35+ Permits to Operate

EPA RACT/BACT/LAER Clearinghouse:

OH-0379, TX-0846

Other Air Districts:

- Sacramento Metro Air Quality Management District
- San Joaquin Valley Air Pollution Control District

EPA Tier 4 Emission Standards

Maximum Engine Power	Emission Limits (g/kW-hour)			
	NMHC ⁽¹⁾	NO _x	CO	PM ⁽²⁾
19 ≤ kW < 56	4.7		5.0	0.03
56 ≤ kW < 130	0.19	0.40	5.0	0.02
130 ≤ kW ≤ 560	0.19	0.40	3.5	0.02
kW > 560	0.19	0.67	3.5	0.03

Notes:

1. Non-methane hydrocarbons
2. As measured by United States EPA Method 5 (filterable portion only)

Maximum Engine Power	Emission Limits (g/bhp-hour)			
	NMHC	NO _x	CO	PM
50 ≤ HP < 75	3.5		3.7	0.022
75 ≤ HP < 175	0.14	0.30	3.7	0.015
175 ≤ HP < 750	0.14	0.30	2.6	0.015
HP > 750	0.14	0.50	2.6	0.022

Engine Manufacturer	Number of Tier 4 Engine Models ^{(1), (2)} by Horsepower Range			
	50 < HP ≤ 75	75 < HP ≤ 175	175 < HP ≤ 750	750 < HP ≤ 1000
AB Volvo Penta		7	54	15
AGCO Power Inc.		17	46	
Caterpillar Inc.			61	11
Cummins Inc.	4	70	100	1
Daedong Corporation		3		
Daimler Truck AG			12	
Deere & Company		9	15	
Deutz AG		79	77	
FCA Italy SpA		1		
FPT Industrial S.p.A.	4	34	67	
HD Hyundai Infracore Co., Ltd.		29	17	
Hino Motors, Ltd		5	10	
Isuzu Motors Limited		40	60	
JCB Power Systems Ltd.		19		
Kohler Co.		8		
Komatsu Ltd.		30	63	
Kubota Corporation		8	2	
Liebherr Machines Bulle SA			45	
Mahindra & Mahindra Limited		30		
MAN Truck & Bus AG			12	
Mercedes Benz			42	
Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.				1
Motorenfabrik Hatz GmbH & Co. KG	1			
Perkins Engines Co Ltd		43	27	
Same Deutz-Fahr Italia SpA		4		
Scania CV AB			33	
Volkswagen	6			
Volvo Construction Equipment			44	
Yanmar Power Technology Co., Ltd.		9	1	
ZETOR NORTH AMERICA, INC		7		
Total	15	452	788	28

Notes:

1. Source: U.S. EPA Annual Certification Data for Vehicles, Engines, and Equipment, Website (accessed May 2024): <https://www.epa.gov/system/files/documents/2024-02/nonroad-compression-ignition-2011-present.xlsx>
2. Only includes number of unique engine models and does not account for same engine model offered in different engine families.

Availability of Certified Tier 4 Engine Models

How to Comply with Tier 4 Emission Standards?

1

Certified Tier 4 Engine

[Certified by EPA to meet Tier 4 standards]

2

Compliant Tier 4 Engine

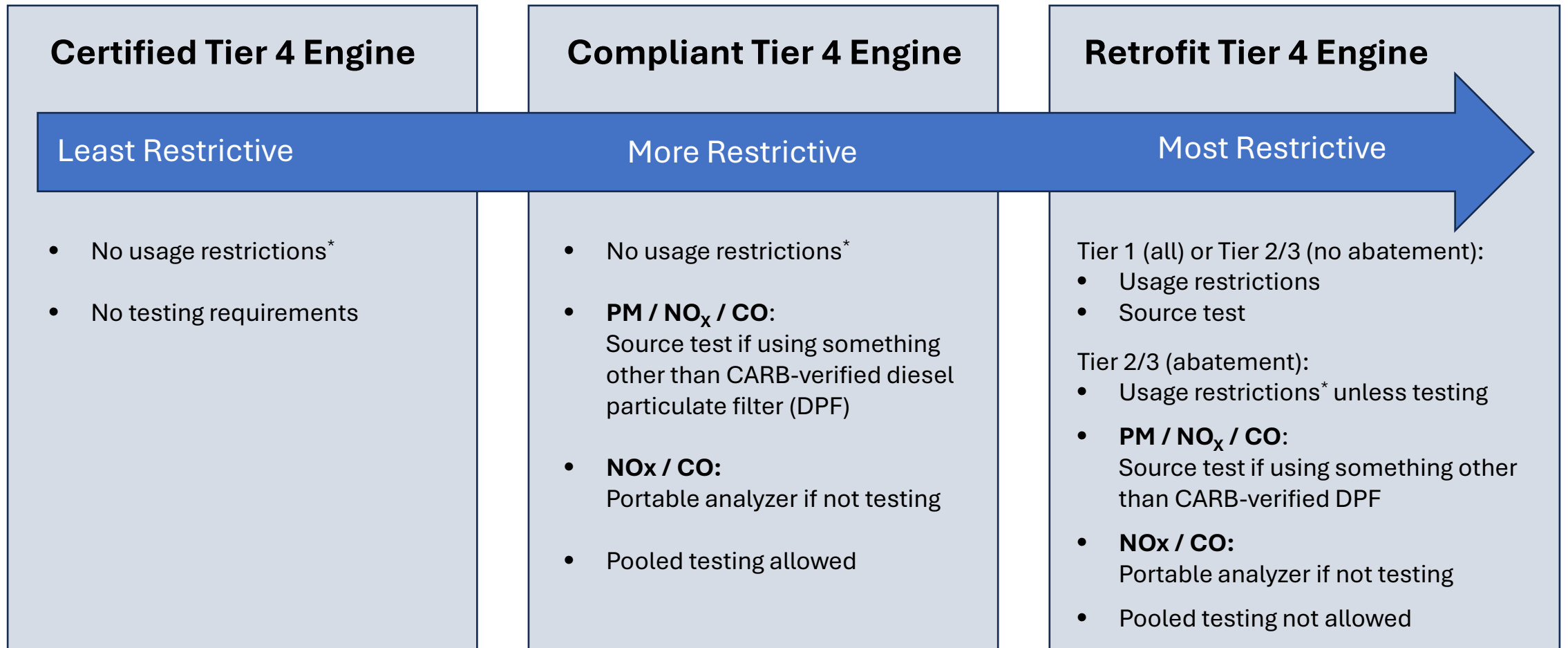
[Packaged by the engine manufacturer with abatement equipment]

3

Retrofit Tier 4 Engine

[A lower tier engine with aftermarket abatement equipment from a third-party vendor]

Advantages to Certified: Proposed Requirements



* Except as limited by Regulation 9, Rule 8 (*Nitrogen Oxides and Carbon Monoxide from Stationary Combustion Engines*) or an Air District health risk assessment

What Can I Do for Faster Permitting?

What Can I Do for Faster Permitting?

- Come in with certified Tier 4
- If you have the option, select engine size and/or hours of use that would not trigger a health risk assessment (best case) or not trigger a refined health risk assessment (HRA)
- Submit a complete permit application, submitted through MyAirOnline
- If engine is within 1,000 feet of a K-12 school, will trigger a public notice
- If engine is within an Overburdened Community (OBC), will trigger a public notice if a health risk assessment (streamlined or refined) is required

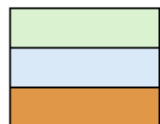
HRA Streamlining – Single Engine Projects

BAAQMD Health Risk Assessment Matrix (Standby, EPA Tier 4 Diesel Engines Less than 1,000 Horsepower)

Engine Capacity Ranges ⁽¹⁾		Maximum Hours Allowed ⁽²⁾ to Avoid Triggering Health Risk Assessment or Refined Health Risk Assessment by Engine Location ⁽³⁾			
kW Range	bhp Range	<100 feet	100-299 feet	300-799 feet	800+ feet
37	56	50	< 75	No Health Risk Assessment	
56	< 75	75	< 100		
75	< 130	100	< 175	Streamlined Health Risk Assessment ⁽⁴⁾	
130	< 225	175	< 300		
225	< 450	300	< 600		
450	< 560	600	< 750		
560	< 750	750	< 1000	Refined Health Risk Assessment ⁽⁴⁾	35 hrs/yr (OBC)

Notes:

1. Use individual engine capacity for single engine projects. Matrix does not apply for multiple engine projects.
2. Regulation 9, Rule 8 limits reliability-related operating time to no more than 50 hours per year for most project.
3. Distance to nearest receptor and whether within an Overburdened Community
4. If project is located within an Overburdened Community and requires a health risk assessment (streamlined or refined), a public notice is required.



An HRA is not required because project emissions are less than HRA trigger threshold in Table 2-5-1. S

Project qualifies for a Streamlined HRA.

Project requires a Refined HRA (includes any projects with fewer than 10 hours/year of reliability-related testing time to avoid triggering a refined HRA).

Operating hours listed in **red** represent the maximum reliability-related operating hours for emergency standby engines that will avoid triggering a Refined HRA.

FAQs

Are Tier 4 emission standards “achieved in practice” for my application?

- If you are applying for a permit for a standby diesel engine, Tier 4 standards have been achieved in practice for your equipment and you will have to meet Tier 4 standards as well (for any pollutant emitted over 10 pounds per day).

What are my next steps if the BACT regulation requires me to meet the Tier 4 standards?

- Contact your engine vendor and determine which Tier 4 engine option (certified, compliant, or retrofit) is best for your situation.

What if I have an Authority to Construct (A/C) for a non-Tier 4 engine but have not installed the engine and do not have a Permit to Operate?

- Permit conditions in an A/C are not reopened when the Permit to Operate is issued. However, if the A/C is expiring, it may have to undergo a new BACT review before it can be renewed. If you have made substantial use of the A/C (e.g., by purchasing or acquiring the engine), then the A/C can be renewed without a new BACT review.

If I withdraw my application for a non-Tier 4 engine, are my fees refunded?

- The Air District will apply your application initial fee to a future application if the proposed engine is intended for the same purpose.

BACT Workbook / BACT Guidelines

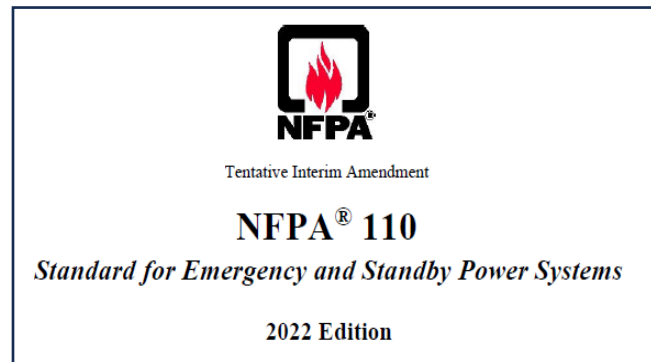
My equipment complies with BACT Workbook. I meet BACT / TBACT, right?

Answer:

It depends. BACT/TBACT is made on a case-by-case basis at the time an application is deemed complete.

Meeting the BACT Workbook may be sufficient, **IF** nothing more stringent has been achieved-in-practice or is technologically feasible and cost effective.

Not allowed to install certified Tier 4 Engines?



5.6.5.5.1 Where used for permanent Level 1 applications, EPA-mandated inducement engine shutdowns due to emissions system controls that are required on Tier 4 certified engines with SCR shall be prohibited.

Technical Committee on Emergency Power Supplies

Committee Member:

EPA allows for disabling of the inducement shutdowns to be used in cases of level one (direct risk to human life) installations. This is permitted per EPA Title 40, chapter I, subchapter U, part 1039, subpart G. 1039.665.

Committee Member:

This is not an emergency condition. The Standard already requires qualified personnel to perform maintenance and operational testing of the EPSS. By definition, qualified personnel would have received training and demonstrated their understanding of same. Qualified personnel would have received training to identify potential hazards and hazardous situations and would know how to mitigate same. Certified engine manufacturers provide the capability and instructions to override or bypass inducement in accordance with federal law. Even without a specific requirement in the Standard, a qualified person would be reasonably expected to prohibit engine shutdown due to an inducement issue while the engine (generator assembly) is supplying a Level 1 load.

Certified Tier 4 Inducements

- Required on engines equipped with a Selective Catalytic Reduction (SCR) system (some manufacturers meet Tier 4 without an SCR)
- Engines can have an auxiliary emissions control device (AECD)* installed
- AECD allows temporary disabling of emission controls during a qualified emergency situation (direct or indirect risk to human health)
- Allows one time override for 120 hours (5 days) per use without inducements, after this a temporary code from the manufacturer or input from a qualified service technician or equivalent security feature unique to each engine is required

* 40 CFR Part 1039.665

What are NFPA 110 Levels?

- NFPA 110 (Sections 4.4.1 and 4.4.2):
 - **Level 1:** where failure of the equipment could result in loss of human life or serious injuries.
 - **Level 2:** where failure is less critical to human life and safety

Level 1 Examples:

- (1) Life safety illumination
- (2) Fire detection, alarm, and notification systems
- (3) Elevators,
- (4) Fire pumps,
- (5) Emergency services communications systems,
- (6) Industrial processes where interruption would produce serious life safety or health hazards,
- (7) Essential ventilating and smoke removal systems, and
- (8) Medical life sustaining systems.

Level 2 Examples:

- (1) Heating and refrigeration systems,
- (2) Communications systems,
- (3) Ventilation and smoke removal systems,
- (4) Water and wastewater treatment systems,**
- (5) Lighting, including the unit
- (6) Industrial processes.**

Standby generators used solely for telecommunications services that utilize battery backup in compliance with FCC guidelines are classified as other than Level 1 or Level 2.

Essential Public Services

My facility is an “essential public service” per Section 9-8-233:

233.1 A sewage treatment facility, and associated collection system, which is publicly owned and operated;

233.2 Water treatment and delivery operations;

233.3 Public transit;

233.4 Police or fire fighting facility;

233.5 Airport runway lights; or

233.6 Hospital or other medical emergency facility.

Scenarios

Scenario 1: Emergency, standby generator at a wastewater treatment plant

- Not subject to NFPA 110 Section 5.6.5.5.1
- Does not need an auxiliary emissions control device (AECD), can install any certified Tier 4 engine

Scenario 2: Emergency generator at a hospital powering office lights (not powering any life sustaining equipment)

- Not subject to NFPA 110 Section 5.6.5.5.1
- Does not need AECD, can install any certified Tier 4 engine

Scenario 3: Emergency generator at a hospital powering life sustaining equipment

- Subject to NFPA 110 Section 5.6.5.5.1
- Can install a certified Tier 4 engine but will need one with an AECD if certified engine has an SCR

Does This Mean BACT/TBACT is Certified Tier 4?



NO



However, permit conditions require abatement at all times of operation (including emergencies).

If operated without emission controls, owner/operator would be in violation unless they obtained a variance from the Air District Hearing Board or obtained breakdown relief per Section 1-112.



Question and Answer Period

